RESPONSE AND REMARKS

I. Status of the Claims

Claims 1 – 7, 9, 11, and 12 are pending in the application, and new claims 29 and 30 are presented by this amendment. Claim 1 is currently the sole independent claim.

Claims 1 – 7, 9, 11, and 12 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 1, 2, 9, 11, and 12 are rejected under 35 U.S.C. § 102(b) as being anticipated by Schweizer et al. (U.S. Pat. Appln. No. 2001/002297 A1)(hereafter "Schweizer").

Claims 3, 4, and 5 – 7 are rejected under 35 U.S.C. § 103(a) as follows: claims 3 and 4 are rejected as being unpatentable over Schweizer in view of U.S. Pat. No. 3,834,881 to Niebylski (hereafter "Niebylski"); and claims 5 – 7 are rejected as being unpatentable over Schweizer in view of U.S. Pat. No. 3,309,249 to Allen (hereafter "Allen").

The previous holding of allowability of claims 10 (now cancelled) and 11 is withdrawn.

By the foregoing "Amendments to the Claims," claims 1, 2, and 6 are amended and new claims 29 and 30 are presented, all as discussed below.

II. Amendments to the Claims

In response to the referenced Office Action and for clarity and grammar, claims 1, 2, and 6 have been amended as shown above on pages 2 and 3 hereof. The amendments to the claims are supported by the specification and claims of the application as filed. In addition, new claim 29 is presented and is also supported by the specification and claims of the application as filed.

Claim 1 has been amended to remove the reference to "produc[ing] a thermite mixture." The basis and effect of this amendment is discussed below. Applicant submits that the claim as amended is supported by the application and claims as originally filed.

Claim 2 has been amended for grammatical reasons only. As previously written, the claim contained a mixed Markush group. The claim has been rewritten to recite a single Markush group without altering the scope of the claim as originally written.

Claim 6 has been amended for the sole purpose of correcting a typographical mistake relating to the position of the word "and," the amendment not altering the scope of the claim as originally filed.

New claims 29 and 30 are discussed below in the context of Applicant's response. Briefly, based on the removal of the "thermite" limitation from claim 1, claim 29 has been added to dependently claim that limitation. Claim 30 has been added to recite a dependent claim specifying certain materials for the claimed reactive material. Both of these new claims are supported by the specification and claims as originally filed.

III. Response to the Office Action

A. Applicants appreciate the Examiner's explanation of the disposition of the claims, but respectfully request that, in light of the foregoing amendments and the following considerations, the Examiner reconsider and withdraw the rejections stated in the Office Action. The new art cited against Applicant's invention not only does not render the invention unpatentable, but helps clarify the reasons the invention is novel and unobvious.

As set forth in Applicant's specification, prior art reactive materials consisted largely of polymers and polymer mixtures. Any additional components were added as slurries or particles to achieve a higher surface to weight ratio for good reactivity. Difficulties arise with such reactive materials, particularly when used as ordnance. Polymers tend to deform under the influence of accelerative forces such as a propellant charge. Shape, however, can be a critical characteristic of reactive materials, so deformation must be avoided or at least minimized. Prior hereto, such efforts to avoid deformation took the form of restraining the reactive material by baffles or boxes. Applicant has determined that a reactive material suitable for various uses can consist of a foamed metal and a polymer. Addition of fine metal or metal oxide particles, or a mixture thereof, is used to moderate or add to the reaction of the reactive materials. That is, the particle mix may be used to modify the primary reactive reaction, *e.g.*, the speed or temperature thereof, and/or may be selected so as to form a thermite. In the latter case, the particulate metal, metal oxide, or mixture can be selected such that the thermite is comprised of the combination of (i) the selected particulates themselves, (ii) one or more of the particulates with the imbibed polymer, (iii) one or more of the particulates with the metal foam, or (iv) any combination of the

foregoing. *See, e.g.*, Allen at col. 3, ll. 5-18 (Table), setting forth metal/metal oxide, metal/metal nitrate, and metal/fluorocarbon thermite reactants.

Based on the foregoing, Applicant submits that claim 1 as currently amended is not indefinite. The reactive material includes the metal foam, the polymer imbibed therein, and a particulate material that may be metal, metal oxide, or a mixture of metal and metal oxide. The particulate material may be chosen by one of ordinary skill in the art as taught be Applicant's disclosure so as alter the primary reactive reaction as desired and/or to create thermite as described above.

New claim 29 has been added to specify that at least some of the added particulate material be selected specifically to form thermite. The thermite mixture may consist of a powdered metal/powdered metal oxide combination, powdered metal oxide/metal foam combination, powdered metal/polymer mixture or other combinations, depending on the particular selection of each of the foam metal, polymer, and particulate material components, all as known by those of skill in the art in light of Applicant's disclosure.

Based on the foregoing, Applicant respectfully submits that neither amended claim 1 nor new claim 29 is unpatentable for indefiniteness. Furthermore, based on the foregoing and the amendment to claim 1, Applicant further submits that none of the remaining claims are indefinite. Applicant therefore requests that this ground of rejection be withdrawn.

B. Claims 1, 2, 9, 11, and 12 are rejected under § 102(b) as being unpatentable over Schweizer. Applicant respectfully submits that this rejection is based on an incorrect understanding of either or both of Schweizer and Applicant's invention.

Applicant's invention relates to a reactive material comprising a metal foam and a polymer. As Applicant points out at Application page 4, lines 22-24, each component of the reactive material may be not reactive alone. The components together, however, react with each other under the appropriate conditions. Even if the selected metal foam is not a reactive material by itself, it is a reactant in the reactive reaction when combined with the selected polymer. Such a material becomes reactive when the polymer is imbibed therein. The particulate material component, as set forth above, alters or enhances or adds to the reactive reaction.

In stark contrast, the metal foam component of Schweizer's combination is required to be *inert* with respect to the pyrotechnic material. *See, e.g.,* Schweizer at Abstract, para. 0007 (defining that "inert" means to make "no or only a relatively small contribution" during combustion of the pyrotechnic layer), para. 0016 (Nickel is "particularly successful because it is also chemically inert at the high temperatures produced during combustion"), claim 1 ("A pyrotechnic layer . . . comprising a pyrotechnic material associated with an inert material substrate carrier."), and claim 5 ("The pyrotechnic layer of claim 1 wherein the inert material substrate carrier . . . is formed from an inert metal . . . ."). Thus, Schweizer specifically teaches that the metal foam should make no contribution to the reaction. Schweizer thus fails to teach at least one aspect of Applicant's claim invention, namely, that the metal foam is a component of the reactive material.

Because Schweizer fails to disclose at least the aspect or component of Applicant's claimed invention that the foamed metal is reactive, at least in combination with the polymer, Schweizer is an improper basis for a rejection under § 102(b). Applicant respectfully requests that this ground for rejection be withdrawn.

C. Claims 3 and 4 are rejected under § 103 based on Schweizer in view of Niebylski, and claims 5-7 are rejected based on Shweizer in view of Allen. Applicant respectfully submits that there is no teaching or suggestion in the cited art or in the art itself for combining the references. Such an objective teaching or suggestion must exist to avoid the improper use of hindsight or the improper use of Applicant's disclosure as a blueprint for selecting otherwise disparate components from the prior art.

Neither Schweizer nor Niebylski teach a metal foam that is a component of a reactive material. In Schweizer, the metal foam (if used) is required to be an inert material, that is, it specifically *cannot be* a component of the reactive material. Indeed, one of the very purposes of the metal foam taught by Schweizer is to prevent the pyrotechnic material from destroying or damaging more than it is intended. *See, e.g.,* Schweizer at para. 0008 wherein it is taught that Schweizer's inert material, whether metal foam or other, has the purpose of forming a thermal buffer and preventing uncontrolled energy losses caused by diffusion. Niebylski is completely

silent with respect to reactive materials, the foamed product claimed therein being intended for creating a compressible material not subject to catastrophic shear.

Nothing in these two references would suggest to one of skill in the art that the metal foam should be a component of a reactive material. Niebylski says nothing in this respect. More importantly, one reading Schweizer would be lead directly *away* from Applicant's teaching. The teaching of Schweizer is that a foamed metal such as nickel is inert with respect to the pyrotechnic component. One of skill in the art, based on this teaching, would be directly dissuaded from using such a metal as a reactant component of a reactive material. Whether considered alone or in combination, the references would at best discourage one from using metal foam as a component of a reactive material.

The same reasoning is applicable to the combination of Schweizer and Allen with respect to claims 5-7. Schweizer is contrary to the Applicant's teaching. Allen teaches thermites, but is silent with respect to the use of metal in reactive materials, not to mention the use of foamed metal in reactive materials. Here again, the references each alone or together fail to teach or suggest Applicant's claimed invention, with Schweizer specifically teaching a contradiction to Applicant's invention.

Applicant respectfully submits that the three cited references, even when considered together, would not have rendered Applicant's invention obvious at the time it was made. Each individually is silent with respect to at least one aspect of Applicant's invention but, more importantly, neither a single reference nor the combination has been should to provide the objective teaching required for the rejection. This lack is overwhelmingly reinforced by the highly contradictory teaching of Schweizer, which would lead one to reject, rather than consider, the use of metal foam as a component or reactant of a reactive material. Applicant therefore requests the withdrawal of this ground of rejection.

IV. Conclusion

Based on the foregoing, Applicant submits that the claims are currently in compliance with § 112 and are not invalid under either § 102 or § 103. Applicant requests that the rejections of the pending claims be withdrawn, and that the claims be found to be in condition for allowance. Early notice of allowability is respectfully solicited.

Should the Examiner have any questions about this application or Response or believe that discussion would advance the prosecution of this application, the Examiner is invited to contact Applicant's representative at the telephone number listed below.

Respectfully submitted,

OSCAR A. TOWLER, III
Registration No. 33,803

Date: August 04, 2006

DEPARTMENT OF THE NAVY
Naval Surface Warfare Center – Dahlgren Division
Office of Counsel – Code XDC1
17320 Dahlgren Road
Dahlgren, Virginia 22448-5100
Telephone: (540) 653-4029 **Customer No. 23501**

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 50-0967